Final Report
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Prepared for:
Recycling Public Advisory Council
***c/o* DNREC**
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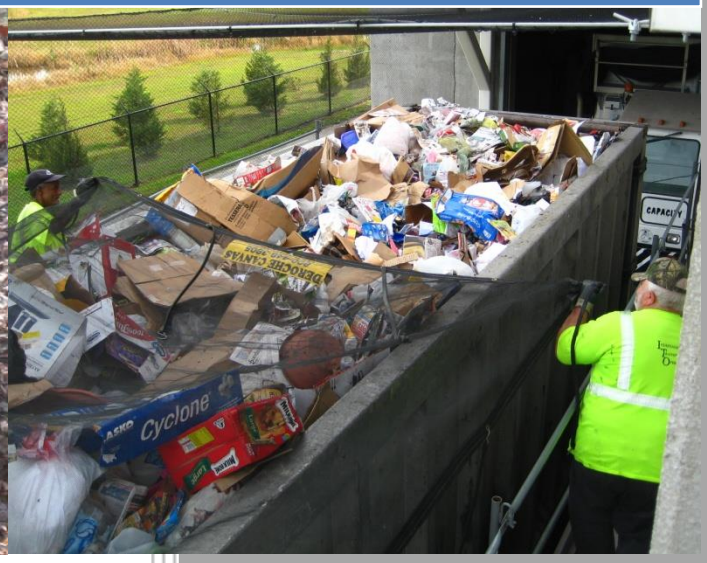
Dover, DE 19901

State of Delaware Assessment of Municipal Solid Waste Recycling For Calendar Year 2012



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ACKNOWLEDGEMENTS AND LIMITATIONS

DSM Environmental Services, Inc. would like to thank the many Delaware organizations, facilities and individuals who voluntarily participated in this survey in the past. In CY 2011, reporting on recycling activity in Delaware became mandatory. The added detail in reporting by many firms this year (CY 2012) has provided DSM with additional data and information on material quantities and flow to improve the accuracy of reporting on Delaware's recycling rate.

Roughly 210 organizations and recyclers have been identified by DSM that generate large quantities or handle recycled materials generated in Delaware. Roughly 173 of these handle material that might be classified as municipal solid waste recycling, with the balance handling construction and demolition waste, agricultural waste and industrial waste that is not part of the annual recycling reporting protocol followed in Delaware. DSM was able to obtain complete survey information from 154 of these 173 organizations. Some of these completed surveys represent multiple individual generator locations in Delaware such as retailers or grocery chains who report through their corporate headquarters after consolidating information from multiple stores located in Delaware.

The list of generators and handlers identified by DSM is by no means a complete list of organizations that are subject to the new recycling reporting requirement. The goal has been to target reporting from those generators and handlers whose information is critical to making accurate reporting of recycling activity. For example, reporting by small recycling haulers who exclusively use recycling facilities located in Delaware and that do regularly report is not essential to develop accurate information. In addition, reports from large generators of recycled materials that exclusively use in-state recyclers who already report are also not critical. Identifying these circumstances and providing adequate exemptions will be an ongoing challenge of carrying out the annual reporting.

As in past years DSM's focus has been to gain participation from all of the larger recyclers in the State, although with the new reporting requirement, smaller recyclers are also subject to reporting, and many have done a good job at complying as well.

Recycling represents an important source of economic activity in Delaware, as well as a strategic source of materials for the United States manufacturing base. As such, the annual survey of recycling activity provides critical data to municipal and state government, and private industry in their attempts to increase recycling in Delaware.

HISTORY

DSM Environmental Services, Inc. (DSM) first surveyed and reported on recycling activity in Delaware in 2005 for the Delaware Solid Waste Authority (DSWA), attempting to quantify all types of materials being recycled or recovered for beneficial use in Delaware from all sources. Since that time, the Recycling Public Advisory Council (RPAC) Subcommittee on Measurement and Reporting (M&R Subcommittee) worked to differentiate between materials classified as municipal solid waste (MSW) following the United States Environmental Protection Agency (EPA) definition, and all other materials.

Starting in CY 2007, DSM followed the M&R Subcommittee's charge to survey and report on recycling in Delaware, and concentrate only on materials included in the EPA MSW definition. This report represents CY 2012 recycling activity and includes recyclable materials collected or managed by DSWA and the private sector. In previous years, DSWA reported directly to RPAC on their recycling activities, and that material was excluded from DSM's totals and aggregated in the final report to RPAC. This report accounts for all DSWA materials recycling as well as includes DSWA material in the estimates made for recycling by the residential and commercial sectors.

The original 2005 study entailed on-the-ground surveys of most of the large generators and processors of recyclable material in Delaware focusing on materials recovery from the commercial and industrial sector. The 2006 – 2012 assessments have built on the original 2005 database, relying on the internet, email, mail, faxing, and telephone calls to collect the information, update contacts and eliminate those organizations no longer operating in Delaware.

INTRODUCTION

This is the second year that the State of Delaware Universal Recycling Law has mandated reporting on recycling activity. As a result, DSM has received reports from several first time reporters and reports submitted have been more complete.

As in the previous assessments, DSM has attempted to identify any new recyclers in Delaware to include in the survey, and also has attempted to disaggregate recycling by residential versus commercial sources.

However, as in previous years, the results are only as good as the data inputs. DSM relies on reporters to submit accurate data on the types and volume of materials recycled, and on the end users of their material to ensure all materials recycled are counted but that materials are not double counted.

RESIDENTIAL VERSUS COMMERCIAL RECYCLING CATEGORIES

Each year that DSM has reported on recycling in Delaware we have attempted to distinguish between household (residential) and commercial (business, industry and institutional) recycling. For this reason DSM relies on the surveys not only to calculate an overall recycling rate but to distinguish between residential and commercial recycling activity. In some cases where it is not clear whether recyclables should be classified as residential or commercial, materials have been allocated to residential or commercial based on previous decisions made by the M&M Subcommittee. These decisions have been carried forward for CY 2011 to maintain consistency in reporting.

The resulting report is intended to provide baseline, CY 2012 data on all residential and commercial materials being recycled from Delaware generators that meet the US EPA definition of MSW, including DSWA handled material.

DISPOSAL ESTIMATES

This report includes MSW disposal estimates for 2012. In the past DSWA has reported directly to RPAC on MSW disposal, and RPAC has estimated residential and commercial waste disposal.

For 2012, DSM has reviewed detailed data from DSWA on incoming vehicles and waste classifications. These data are used to estimate total residential, commercial and C&D waste deliveries for disposal for CY 2012. These totals enable a CY 2012 MSW recycling rate calculation to be made for Delaware for use by RPAC in measuring progress toward State goals.

MATERIAL CATEGORIES

This assessment encompasses all material identified by the EPA as Municipal Solid Waste (MSW) and defined in the EPA document, *Measuring Recycling, A Guide for State and Local Governments* (September 1997) as:

> *"Wastes such as durable goods, nondurable goods, containers and packaging, food scraps, yard trimmings, and miscellaneous inorganic wastes from residential, commercial, institutional, and industrial sources such as appliances, automobile tires, old newspapers, clothing, disposable tableware, office and classroom paper, wood pallets and cafeteria wastes."* MSW *"excludes solid waste from other sources, such as construction and demolition debris, auto bodies, municipal sludges, combustion ash, and industrial process wastes that might also be disposed of in MSW landfills or incinerators. (US EPA1996b)"*

The EPA guidance document further defines what is and what is not MSW (Table A, Appendix B), and what counts as recycling and what does not count as recycling (Table B, Appendix B). These tables and accompanying table notes are included as references in *Appendix B* to this report. While the EPA guidance document is helpful in delineating what materials to include in the measurement of MSW recycling it is often the case that recycling generators, brokers and processors do not report, or keep records, sufficient to differentiate between materials that would be included or excluded from EPA's definition of recycling.

DSM's approach for this 2012 assessment is consistent with previous years, surveying only those residential, commercial and industrial activities that would be expected to generate and recycle materials that fall into EPA's definition of MSW and recycling as shown in Table 1 below (in column 2 titled "EPA's MSW"). In some cases it was necessary to survey generators or recyclers who manage both included and excluded materials, in which case the generator/recycler was asked to estimate the quantity of included material(s) only. For example, DSM has limited reporting requirements for scrap metal recyclers, focusing only on three types of metals included as MSW recycling – appliances, lead acid batteries and aluminum cans. All other scrap metal is not counted toward the MSW recycling rate.

Table 1 lists each material type included in the first column of Table 1 consistent with the way the EPA reports materials recycling. Check marks in Columns 3 (EPA's MSW), 4 (Industrial) and 5 (C&D) identify which waste (or recycling) stream the material is most likely to be generated from. In the case where a material is classified as both "EPA's MSW", and therefore included, and as "Industrial" (e.g. industrial process waste) or "C&D" (e.g. construction and demolition waste), and therefore excluded, the items excluded are noted in the second column.

DSM's survey and reporting methodology, including a description of all material categories, follows Table 1. This includes the assumptions associated with allocating these materials to excluded or included categories. The final recycling numbers reported for CY 2012 can be found in Table 2.

Finally, in the case of metals the checkmark is centered between columns indicating that in most cases there is no way of determining the source of the material. For this reason, metals except for appliances and packaging containers have been excluded from further consideration. This approach results in the calculation of a lower recycling rate than if metals (other than appliances) were counted toward MSW recycling.

TABLE 1: TYPE OF MATERIALS INCLUDED IN DELAWARE RECYCLING STUDY, AND GENERATOR CATEGORY[1]

Material Category	EPA Exclusion from MSW	Delaware Generators of Recycled Materials		
		EPA's MSW	Industrial	C&D
Paper, and Paper Packaging				
Corrugated Cardboard (OCC)	*C&D corrugated recycling*	√		√
Newspaper (ONP)	*Print overruns*	√	√	
Sorted Office Paper		√		
Mixed Paper (includes junk mail)	*Print overruns and over issue*	√		
Non Paper Packaging				
Plastic Film and Shrink Wrap	*Pre-consumer plastic waste*	√		√
Plastic Bottles and Containers		√		√
Mixed Plastics/Other Plastics	*Pre-consumer plastic waste*	√	√	√
Aluminum Cans		√		√
Glass Bottles and Jars		√		
Scrap Metal				
Aluminum	*Nonferrous metals from industrial or construction sources, ferrous metals from transportation equipment or C&D waste.*		√	
White Goods / Appliances		√		
All other Nonferrous Metals			√	
All other Ferrous Metals			√	
All other Metals			√	
Automotive Wastes				
Oil Filters		√		
Waste Oil	*Excluded from MSW*	√	√	
Lead Acid batteries	*Batteries from large equipment, boats, heavy duty trucks and tractors, and from industrial applications.*	√	√	
Tires	*Bus and heavy farm and construction equipment tires; tire derived fuel.*	√		
Organic Waste				
Food Waste	*Food processing waste*	√		
Fats, Oils, Grease		√		
Leaf and Yard Waste		√		
Tree Waste	*C&D stumps and trees and wood used for biomass.*	√		√
Clean Wood	*Wood used for biomass.*	√		√
Pallets	*Wood used for biomass and pallet repair and reconstruction.*	√		√
Textiles	*Reuse of apparel*	√		
Poultry Wastes, Sludges	*Excluded from MSW*		√	
Municipal Biosolids	*Excluded from MSW*		√	
Food Processing Waste	*Excluded from MSW*		√	
Bottom and Fly Ash	*Excluded from MSW*		√	
Special Wastes				
Electronics		√		
Florescent Bulbs	C&D debris	√		
Other Batteries		√	√	
Carpet		√		√
Other Construction Wastes				
Asphalt	Excluded from MSW			√
Concrete and Brick	Excluded from MSW			√
Soils and Stones	Excluded from MSW			√

[1] A single check mark used for metals, except appliances, indicates that it is impossible to disaggregate quantities reported by generator type (e.g. residential/commercial, industrial and/or C&D) which is required to classify recycled metals as MSW.

PROJECT APPROACH

SURVEY METHODOLOGY

The CY 2012 assessment followed the same methodology as the 2006 - 2010 RPAC assessments with the exception of DNREC involvement in drafting letters to those impacted by the new reporting requirement. DNREC notified potential generators, haulers and processors of recyclable material in 2012 to inform them of the new reporting requirement as well as drafted a letter for DSM to use to accompany the DSM letter and survey that went out.

DNREC also sent certified mail in May 2012 to those non responders notifying them of their reporting responsibility. This resulted in an additional 18 surveys submitted to DSM by June 30. Follow up by DNREC and DSM after June 30 resulted in four more surveys coming in by September 30.

The survey methodology is described in detail below.

First, DSM used the database of recycling contacts developed originally during the 2005 survey and updated for the 2006 – 2011 surveys to ensure all materials discussed with the M&M Subcommittee were included, and that all of the major recyclers (and/or handlers/brokers) were included. As in the past, the 2012 survey was augmented by contacting many of the largest generators of recyclable material in Delaware to verify where their recyclable material was being sent. This assisted our effort to eliminate double counting.

The types of facilities included in DSM's master contact list fall into the following major categories:

- ***Recycling haulers*** that collect recyclables from small and large generators.

- ***Processing facilities***, brokers and end users that either handle, process or buy recovered fiber, plastics, metals, glass and pallets.

- ***Large retailers and grocers*** that generate large quantities of corrugated cardboard, film, pallets, appliances, and/or lead acid batteries and who tend to backhaul these materials to internal central distribution centers for processing and marketing. This is especially critical for corrugated containers because many of the national and regional grocers and retail chains (e.g. Wal-Mart, Food Lion, Acme/Sav-A-Lot) organize backhauling of baled corrugated cardboard from their retail stores to a central warehouse, rather than rely on local waste haulers or paper brokers. Therefore, recycling of corrugated containers would be under-counted if the survey only relied on reports from waste haulers and paper brokers.

- ***Financial institutions and insurance companies*** that are large employers in Delaware and are likely to generate large quantities of paper waste for shredding and recycling. DSM attempted to contact these large financial institutions to ensure that most of the large shredding operations were identified and contacted, and, similar to retailers, that national accounts for shredding and recycling of Delaware materials were reported and accounted for, even if they were located outside of Delaware.

- ***Large generators and processors of leaf and yard waste and natural wood waste*** such as major landscaping companies, tree companies, land clearing companies and mulchers, who grind the material for resale, were contacted to attempt to allocate tree waste, especially, between MSW and non-MSW categories.

In all cases survey respondents were offered the opportunity to request that the data be kept confidential. As such, data on quantities by individual firms are not included in this report and will not be available to the RPAC, although the totals reported include all these materials.

Second, letters from DNREC and DSM, including an updated survey form, to all recyclers and large generators that reported in 2011, as well as all contacts in our database for which DSM had a valid e-mail address. An increased reliance on e-mail to carry out the survey has helped to increase the efficiency and accuracy of the survey process. A copy of the survey form was also made available for download on the DSM web site and the DNREC website.

In cases where DSM had no e-mail address or if the e-mail sent by DSM was returned, DSM made one or more telephone attempts to the contact person, and then followed up with both the DSM and the DNREC letter along with the survey form.

Finally DSM followed up the e-mails sent with telephone calls and subsequent e-mails to try to obtain updated figures, any change in information and final survey forms. A copy of the letter from DNREC, DSM and the updated survey form are all attached as Appendix C.

Third, DSM updated our database with any new companies and recyclers found using internet searches, identified during telephone interviews or identified in the completed surveys. DSM also updated our database to remove any companies that had closed, merged or were no longer operating in the State of Delaware. DSM also updated our database with new contact names as applicable. DSM also attempted to speak with larger companies and facilities to find out whether any major changes had taken place (e.g., retail stores added or closed, companies grew and shrunk, or brokers changed).

Fourth, DSM attempted to collect the following information from each survey participant:

- Types of materials handled or recycled;
- Names of facilities or brokers used for processing in CY 2012 (to ensure double counting did not occur);
- Quantities recycled by material type for CY 2012;
- Whether the material was classified as residential or commercial; and,
- Specific end uses of materials to ensure that uses such as tire derived fuel, wood for biomass, and shredded paper to waste to energy facilities would be excluded from the totals reported.

As the State of Delaware is working toward enforcement of the mandated reporting criteria DSM has also been actively working with potential responders to emphasize corporate responsibility and accountability for both the reporting deadline as well as the accuracy of the data being provided. In order to increase the accountability for the information being provided for the 2012 period DSM did make a significant adjustment in the collection of survey data. During previous reporting years DSM had, in some cases, and particularly for smaller businesses, allowed reporting information to be collected over the telephone with a DSM staff member filling in the survey form on behalf of the responder.

However, during the 2012 reporting period DSM requested that all responders complete the required survey form and provide DSM a copy of the completed survey form. This helps push accountability for all data back on the representative who provided the data.

Fifth, DSM collected all data from DSWA on recyclable materials handled through DSWA facilities, including the assumed source of the material (e.g. residential vs. commercial) and end users to ensure double counting of materials from other recyclers and buyers reporting did not occur.

Finally, on a case-by-case basis, if a relatively large generator of recyclables failed to respond to the 2012 survey, data from 2011 was used as a placeholder, but only if DSM expected that no major changes to that company had occurred during 2012. These data are specifically noted. However companies that did not report in 2010 or 2011 were excluded in 2012. It should be noted that these decisions do impact quantities recycled, and can impact the recycling rate. DSM has attempted to be consistent with respect to this procedure to allow for a consistent methodology over time. It also should be noted that excellent participation was achieved from the larger recyclers for 2012. The need to utilize this procedure was important when reporting was voluntary, but should be significantly reduced going forward as all recyclables generators recognize their legal responsibility to report under the Universal Recycling law.

Excluded and Included Material Types

This recycling rate report concentrates on materials recycled from municipal solid wastes only. Construction and demolition wastes as well as industrial process wastes are excluded. In addition, gaseous and liquid wastes, infectious wastes, and RCRA Sub-title C hazardous wastes are excluded. It should be noted here however, that to the extent that included materials, especially corrugated cardboard generated from construction and demolition activities but collected for recycling are included in reports from brokers and processors, they would be included in the totals reported.

Potential for Use as Energy Recovery

Materials that were recovered but directly sent, or processed and sent for energy recovery were excluded. Examples of materials include tires processed for tire derived fuel, and wood and oil sent for fuel use. In addition, because end uses for most oil reported could not be determined, oil recycling was not reported.

Potential for Off-Site Disposal

Consistent with EPA guidelines, only those materials which would be disposed off-site if they were not beneficially reused or recycled, and therefore could potentially be delivered to a Delaware landfill, are included in the assessment. Examples include:

- Wood chips and stumps that are disposed on site are excluded while wood waste, including trees and stumps, that must be removed from the site are included. However, wood waste that would be disposed of with C&D waste was excluded in cases where DSM could confirm that this was the case.

- Plastic wastes reused on-site in a manufacturing process are excluded, but plastic wastes sent off-site for reclamation are included.

- Pallets that are reused or rebuilt on-site (or off-site) are excluded, but pallets that are shipped off-site for grinding for mulch are included in the totals.

IMPORT AND EXPORT

In all cases the assessment excludes materials that are generated outside of Delaware but imported into the State for either recycling or beneficial reuse. Similarly, this report attempts to include recyclables generated in Delaware but exported for recycling, although in some cases this may not be possible because out-of-state processors may not be subject to the reporting requirement. For example, recycled materials backhauled or transported from large generators in Delaware directly to out-of-state warehouses or recyclers are included (e.g., grocery stores that backhaul cardboard to an out-of-state, central distribution facility) and any out-of-state material consolidated at a Delaware warehouse/recycler is excluded.

DESCRIPTION OF FINAL MATERIAL CATEGORIES

A detailed description of the material categories tracked, the specific data gathering approach and the recycling process, if any, is described below.

AUTOMOTIVE WASTES

Automotive wastes include the byproducts from operating cars and trucks, such as oil filters, waste oil, lead acid batteries and tires. DSM excluded antifreeze and other cleaning solvents from these estimates.

- ***Oil Filters:*** DSM obtained data on oil and oil filter recycling from large generators (manufacturers), processors (e.g. Safety Kleen), and collectors (DSWA) which are reported here. DSM believes oil filter recycling is underestimated because not all of the handlers of oil filters were identified and surveyed. In addition, scrap metal recyclers who may handle oil filters that are properly drained are not able to report this material separately so it would be included in their aggregate estimate of ferrous metals and therefore not reported by DSM.
- ***Waste Oil:*** DSM was not able to confirm waste oil recovery for re-refining (which would be counted as recycling), as opposed to energy recovery; therefore waste oil continues to be excluded for CY 2012, as it was in previous years.
- ***Lead Acid Batteries:*** DSM surveyed vendors, generators and collectors of lead acid batteries because they are included as MSW recycling under the EPA definition. In 2006, DSM contacted one regional smelter to confirm lead battery recycling processes and determine if statewide estimates could be made for Delaware. However, the outcome was that they were unable to break down their supply by source, forcing DSM to collect reports from vendors and large generators. As in past years, DSM believes that the CY 2012 survey results continue to underestimate battery recycling in Delaware because of the difficulty in

identifying all companies handling lead acid batteries.[2] Using EPA's per capita estimate of lead acid battery generation and recovery, Delaware's population would account for roughly 9,000 tons recovered. In contrast, 2050 tons (rounded) were reported for 2012 and as in past years, included in these estimates are batteries from large equipment, boats and tractors because recyclers could not break out counts by generator type. (Note that the total amount of material recycled includes both lead and the polypropylene battery casing.)

- ***Tires:*** DSM surveyed several large handlers of tires (including DSWA) to confirm 2012 total quantities recovered. End uses for tires recovered are found to be mainly Tire Derived Fuel (TDF) chips, which are excluded, although some have gone to landscaping, drainage and other engineering products, which are included in the EPA recycling definition. DSM also believes that reported data on tire recycling underestimates total quantities recycled because data on tires that are retreaded are not included in this report and because DSM suspects not all handlers of tires have been identified. (See discussion on tires in Results for more information on this.)

COMMERCIAL WASTE

The commercial waste stream includes a number of materials that are traditionally recycled such as corrugated cardboard, mixed paper, office paper, plastic film and pallets. As in previous years DSM concentrated our survey effort on large commercial generators to ensure that material going to distribution centers and out of state recycling facilities was captured. DSM also made numerous telephone calls to brokers and end users to attempt to account for any material bypassing processing facilities located in Delaware that may have been missed from our survey effort.

The types of business surveyed by DSM and the materials that they typically recycle include:

- ***Professional Offices*****,** including government offices and large employers in the banking, finance and insurance industries such as JP Morgan Chase and Blue Cross Blue Shield, who generate large quantities of office paper waste typically destined for shredding or secure document destruction.

- ***Secure Document Destruction Firms*** that service the banking, finance, health care and insurance industries. As in previous surveys, DSM attempted to verify the end users and reported only tonnage recycled (as opposed to tons incinerated or sent to waste to energy facilities) in this report. DSM also reviewed the major sources (generators) of paper waste to ensure double counting did not occur. Because some document destruction industry amalgamation has occurred in the region over the last 24 months, DSM experienced some

[2] In one case a vendor who was thought to report a significant increase in battery recycling for CY 2010 reported in pounds instead of units or tons. This has been corrected in this CY 2011 report for accurate comparison.

difficulty in identifying all current handlers of materials as some new haulers now operate from out-of-State offices. It also resulted in a misreported SOP figure in the 2011 report. This has been corrected in the 2012 report.

- ***Groceries/Supermarkets***, including most of the major supermarket chains in Delaware such as Acme/Save-A-Lot, Food Lion, Safeway, Shop-Rite, and Supervalu/Pathmark who typically backhaul corrugated cardboard and more recently shrink wrap to central distribution facilities for consolidation for recycling end markets. In addition, separation of food waste for composting that was noted in the 2011 report has continued and grown in 2012.

- ***Retailers,*** including Wal-Mart (which also sells groceries), Lowe's, Home Depot, Sears and other "big box" department stores such as Target and Costco, as well as major chains located in Delaware such as Wawa's and Staples.

- ***Distributors***, such as Standard and NKS (malt beverages) who typically recycle corrugated cardboard and shrink wrap and in the case of beverage distributers, glass as opportunities are available.

- ***Restaurants,*** DSM interviewed representatives of some of the large restaurant chains in 2005 to obtain data on corrugated cardboard recycling and contact information on the rendering facility taking the grease. DSM contacted the major recyclers serving these restaurants in 2012 to obtain statewide quantities.

Note that while DSM asked about container recycling (e.g. beverage containers, cans, jars, jugs and other bottles), these materials were typically not recycled by commercial businesses in 2005 with the exception of those covered under the state bottle deposit legislation. More recently with the availability of single stream recycling collection, these materials are now included in those utilizing single stream collection by major haulers.

All of these materials, with the exception of fats, oil and grease are clearly categorized as MSW and are included in the EPA definition of recycling. (See discussion of fats, oils, and grease in "Food Waste' below.)

FOOD WASTE

This includes expired and waste meats and vegetables from grocery stores and slaughterhouses, and oil and grease from restaurants. Waste meats and oil and grease are recovered and used in feed while waste vegetables and fruits are sent for organics composting out of state, and more recently also in-state at the new Wilmington Organics Recycling Center. DSM did not attempt to estimate backyard composting, which is excluded from EPA's definition of recycling.

For 2012, there was an increase in food waste separation by commercial generators for composting, including grocery stores beginning pilot and permanent programs in hopes to increase diversion at all stores. This increase however was offset by a decrease in waste meats generated from closed slaughterhouses.

It should be noted here that fats, oils and grease collected from restaurants are not explicitly addressed in the EPA Guidance Document. DNREC agreed with DSM's proposal in 2004 to include this material. EPA's definition of food scraps includes liquid fats so DSM has included fats, oil and grease recovered from food preparation, mainly restaurants, in the MSW totals.

GREEN WASTE

This category has been sub-divided into three categories of organic wastes: (1) yard waste or landscaping waste – primarily leaf waste and grass clippings; (2) tree company waste; and (3) tree waste from site clearing.

- ***Yard waste:*** This category is primarily from professional landscapers who typically remove yard waste materials from a job and bring it to a central site for grinding and mulching. This material is reported and counted at the point of processing (grinding). DSM attempted to gain participation from all of the large mulching operations in the state. DSM also included estimates from municipal yard waste collection programs, data from the yard waste sites operated by DNREC, and data on yard waste dropped off at DSWA facilities. All of this material is included in the totals for MSW recycling. Note that this category can include yard waste from commercial sources (e.g. landscaping waste from office parks and shopping malls) as well as from households and residential complexes. DSM attempted to verify all municipalities and other large yard waste collectors/handlers that were sending material to the WORC facility, and other large material handlers, so that this material was not double counted.

- ***Trees and branches:*** This category is for wood waste generated from tree companies and includes tree removal (including some stumps) and branches from trimming. This material is generally delivered to processors for grinding and mulching, but is also delivered to some end users for fuel. DSM surveyed the processors or consolidation points as to the quantities processed and the end use of this material, and reported on only those quantities of trees and branches that were delivered to grinding operations for mulching.

- ***Trees and stumps:*** This category is for tree and stump removal in the process of site clearing for development. This material could be categorized as construction waste (and therefore excluded from MSW recycling), even though most of this material is removed from the site separate from any C&D waste. To the extent possible, DSM has excluded this material, although it is likely that some of this material is ultimately reported as yard waste by the mulchers, or reported as composting (used as a bulking agent) and therefore reported as MSW recycling.

PALLETS AND CLEAN WOOD

This category includes pallets collected primarily from businesses and industry because they are damaged or otherwise destined for disposal, as well as dimensional lumber that is not treated, stained or painted. Companies that handle pallets either rebuild or reconstruct them for resale, or grind them for mulch. Only the portion ground for mulch is reported in the MSW recycling rate (typically around 10% of all pallets collected for reuse and recycling). DSM surveyed pallet recyclers and mulchers to obtain estimates of annual quantities handled. Some clean wood is included in the pallet category as pallet recyclers will often pick up clean wood along with the pallets from a generator. In addition, mulchers rarely distinguish between pallet wood and other clean wood. As long as it is free of stains or paint, and relatively free of nails, they will grind it for mulch. Whenever possible, DSM attempted to distinguish between pallet and wood waste. Note that clean wood is reported separately for CY 2011.

SCRAP METAL

DSM has only included appliances in the assessment of municipal recycling. Unfortunately scrap metal businesses typically do not distinguish appliances from other light iron. Therefore, for purposes of this report, DSM specifically asked scrap metal dealers to estimate the percent of light iron represented by appliances, and worked with scrap metal dealers to report appliance tonnages. DSM also reported backhauling of appliances from big box stores who do not use Delaware scrap dealers.

While EPA also includes metals from furniture, tires and miscellaneous durables in the definition of MSW, DSM believes it would be impossible to accurately estimate the percentage of metals recycled that would be classified as furniture, tires or durables and therefore has excluded these materials from the MSW total. In addition, DSM has excluded other ferrous and non-ferrous metals recycled from the totals to simplify reporting.

Note by excluding all metals but appliances (and aluminum and steel cans), recycling rates reported in Delaware will tend to be lower than those reported in states, such as Vermont, that continue to include other metals.

OTHER WASTES

This category is a catch-all for all other materials that are being recovered including electronics, carpet waste, textiles, and universal waste such as fluorescents containing mercury. While DSM attempted to survey the major recyclers of textiles, carpet, electronics and fluorescents, we were unable to contact all possible generators (some which have their own backhaul and data destruction programs) and processors and therefore the numbers continue to be underreported.

However, even if all recyclers reported, the additional quantities would have a small impact on total recycling as compared to other materials surveyed and reported on in this assessment. Note that any electronics and textiles handled by DSWA are reported here for CY 2011 since DSM surveyed DSWA directly.

STUDY LIMITATIONS

DSM's methodology only counts material reported to be recycled and does not make per capita, per employee, or other estimates based on a generation or recycling coefficient. This methodology is more likely to under-report than over-report recycling activity due to the fact that, despite DSM's best efforts, some generators and brokers have not been identified and are therefore not in DSM's database and do not participate in the surveys.

As in past reports, DSM used some of the prior year's (e.g. 2011) reported data to compensate for any large generators or processors that did not report for 2012 but were known or suspected to still be active recyclers. However there were limited cases where this occurred for 2012 as the survey participation rate for 2012 was very high.

With the mandatory reporting requirement in effect for its second year during 2012, data accuracy has increased along with participation. Participation by haulers and other collectors/handlers who provided detailed reports enabled better cross checking of data than in the past. However the increased use of waste and recycling brokers (located out of state) by the commercial sector has made identifying the appropriate contact for large generators difficult. Where in the past, distribution centers handled corrugated cardboard and other recyclables, there is now a contracted entity responsible. This may change year to year and therefore it has become an ongoing struggle to identify the correct contact for reporting purposes. These limitations may result in reported yearly changes on a material-by-material basis that may, or may not, represent real changes in recycling rates.

RESULTS

Table 2 (on the next page) presents the 2012 results together with the 2011, 2010 and 2009 results to enable comparison. Because of changes in the way recyclables are being collected under the Universal Recycling law, Table 2 also presents DSWA managed recycling separately for 2012, 2011, 2010 and 2009. The difference between the 2012 and 2011 recycling is then reported for DSWA alone and for all other MSW recycling enabling a more straightforward comparison of changes in recycling activity in the State. Because of the large number of materials categories, and changes in recycling activity and material flow between years, Table 2 is heavily footnoted, and followed by a detailed discussion of the 2012 Results by material type.

The 2012 survey results indicate that material diverted for recycling increased by 3.1 percent, or roughly 12,000 tons (rounded) between 2011 and 2012. Although CY 2009 and 2010 tonnages are shown, they are *not included* in the calculation of the difference. However if the Tree and Branch category volumes were excluded from this comparison, recycling tonnage increased 10.3 percent between 2011 and 2012. And if the Tree and Branch volumes for 2012 were carried as the same tonnage levels as 2011, then the 2012 results showed a 6.2 percent increase over 2011. This comparison is helpful because the impact of landscaping debris on the results is so variable, as discussed further in this section.

It is DSM's opinion that the majority of the increase can be directly attributable to the Universal Recycling Law, combined with better reporting due to the enforcement of the mandatory reporting requirement and a small increase in economic activity over the past year. A detailed explanation is presented below.

Figure 1 compares the major material category totals for 2012, 2011, 2010 and 2009 for all materials, including those recycled through DSWA programs and/or facilities. As illustrated by Figure 2, most of the increase is from single stream recycling (labeled as "Mixed Recyclables").

FIGURE 1: COMPARISON OF MATERIAL RECYCLED, CY 2012 - 2009 (TONS BY MATERIAL)

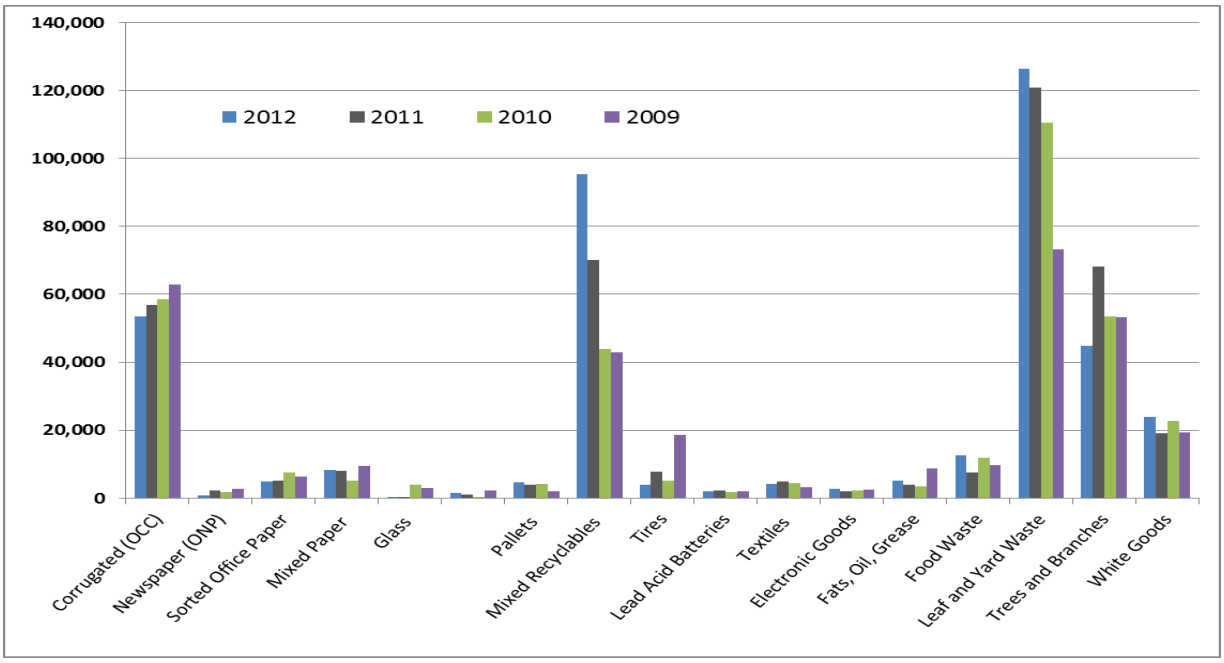


TABLE 2: COMPARISON OF MSW MATERIALS RECYCLED IN DELAWARE, CY 2012, 2011, 2010 AND 2009

	CY 2012			CY 2011			CY 2010			CY 2009			Difference, 2012 - 2011			
Material Category	All Other (tons)	DSWA (tons)	*Total (tons)*	All Other (tons)	DSWA (tons)	Total (tons)	All Other (tons)	DSWA (tons)	*Total (tons)*	All Other (tons)	DSWA (tons)	*Total (tons)*	All Other (tons)	DSWA (tons)	Total Dif. (%)	*Total (tons)*
Paper, Paper Packaging																
Corrugated (OCC)	53,288	252	*53,540*	53,938	2,858	56,796	50,954	7,553	*58,507*	55,984	6,997	*62,981*	-651	-2,606	-5.7%	***-3,256***
Newspaper (ONP)	909		*909*	2,369		2,369	1,769		*1,769*	2,728		*2,728*	-1,460		-61.6%	***-1,460***
Sorted Office Paper **	5,001		*5,001*	5,078		5,078	7,449		*7,449*	6,359		*6,359*	-77		-1.5%	***-77***
Mixed Paper (1)	8,174		*8,174*	8,064		8,064	5,041		*5,041*	9,218	148	*9,366*	110	0	1.4%	***110***
Subtotal:	***67,372***	***252***	***67,624***	***69,449***	***2,858***	***72,307***	***65,212***	***7,553***	***72,765***	***74,290***	***7,145***	***81,435***	***-2,078***	***-2,606***	-6.5%	***-4,683***
All Other Packaging																
Glass (2)	332		*332*	208		208	4,011		*4,011*	2,850	81	*2,931*	124		59.4%	***124***
Plastic Film /Wrap (3)	1,452		*1,452*	974		974	425		*425*	2,178		*2,178*	478		49.0%	***478***
Plastic Containers	30		*30*	223		223	37		*37*	27		*27*	-193		-86.6%	***-193***
Aluminum Cans	696		*696*	728		728	546		*546*	171		*171*	-32		-4.4%	***-32***
Pallets (4)	4,717		*4,717*	3,842		3,842	4,186		*4,186*	1,954		*1,954*	874		22.8%	***874***
Mixed Recyclables (5)	33,079	62,211	*95,290*	16,002	54,133	70,135	4,755	39,051	*43,806*	4,950	38,075	*43,025*	17,077	8,078	35.9%	***25,155***
Subtotal:	***40,306***	***62,211***	102,517	21,979	54,133	76,111	***13,960***	***39,051***	***53,011***	***12,129***	***38,156***	***50,285***	***18,327***	***8,078***	34.7%	***26,406***
Vehicle Waste																
Tires (6)	2,872	951	*3,823*	6,831	989	7,820	5,049		*5,049*	18,735		*18,735*	-3,959	-38	-51.1%	***-3,959***
Lead Acid Batteries (7)	2,052		*2,052*	2,341		2,341	1,893		*1,893*	1,917		*1,917*	-290		-12.4%	***-290***
Oil Filters	379	0	*379*	234	58	292	724	425	*1,148*	195	398	*593*	144	-58	29.6%	***86***
Subtotal:	***5,303***	***951***	***6,254***	***9,407***	***1,047***	***10,454***	***6,440***	***425***	***6,865***	***20,847***	***398***	***21,245***	***-4,105***	***-58***	-40.2%	***-4,162***
Special Wastes			*0*			0			*0*			*0*				***0***
Carpet	0		*0*	742		742	422		*422*	15	63	*78*	-742		-100.0%	***-742***
Textiles (8)	4,284		*4,284*	4,946		4,946	4,413		*4,413*	3,155		*3,155*	-662		-13.4%	***-662***
Florescent Bulbs	15		*15*	8		8	7		*7*	38		*38*	7		95.0%	***7***
Electronic Goods	839	1,933	*2,772*	240	1,883	2,123	241	1,909	*2,151*	449	2,023	*2,472*	599	50	30.6%	***649***
Other Batteries	3	44	*47*	48	48	96	101		*101*	3.48		*3*	-45	-4	-50.7%	***-49***
Subtotal:	***5,141***	***1,977***	***7,118***	5,984	1,930	7,914	***5,185***	***1,909***	***7,094***	***3,662***	***2,086***	***5,748***	***-843***	***47***	-10.1%	***-796***
Organic Wastes			*0*			0			*0*			*0*				***0***
Fats, Oil, Grease	5,103		*5,103*	4,029		4,029	3,557		*3,557*	8,826		*8,826*	1,073		26.6%	***1,073***
Food Waste	12,701		*12,701*	7,624		7,624	11,904		*11,904*	9,812		*9,812*	5,077		66.6%	***5,077***
Leaf and Yard Waste	126,463	0	*126,463*	116,756	4,111	120,867	95,594	14,865	*110,459*	65,886	***7,259***	*73,145*	9,707	-4,111	4.6%	***5,596***
Trees and Branches	44,888		*44,888*	68,157		68,157	53,580		*53,580*	53,281		*53,281*	-23,269	0	-34.1%	***-23,269***
Clean Wood	5,410		*5,410*	5,152		5,152	2,371		*2,371*	0		*0*	258	0	5.0%	***258***
Subtotal:	***194,565***	***0***	***194,565***	201,718	4,111	205,829	***167,007***	***14,865***	***181,872***	***137,805***	***7,259***	***145,064***	***-7,154***	***-4,111***	-5.5%	***-11,265***
Metals			*0*			0			*0*			*0*				***0***
White Goods	23,454	458	*23,912*	18,444	768	19,212	21,676	973	*22,649*	18,174	1,270	*19,444*	5,010	-310	24.5%	***4,700***
Subtotal:	***23,454***	***458***	*23,912*	18,444	768	19,212	***21,676***	***973***	*22,649*	***18,174***	***1,270***	*19,444*	***5,010***	***-310***	24.5%	***4,700***
Other			*0*			0			*0*			*0*				***0***
Mixed Plastics (9)	3,965		*3,965*	2,063		2,063	2,705		*2,705*	669		*669*	1,901	0	92.1%	***1,901***
Subtotal:	**3,965**	**0**	*3,965*	2,063	0	2,063	**2,705**	**0**	*2,705*	**669**	**0**	*669*	1,901	0	92.1%	***1,901***
Total	**340,104**	**65,849**	**405,953**	329,045	64,846	393,891	**282,186**	**64,776**	**346,962**	**267,576**	**56,314**	**323,890**	**11,059**	**1,041**	3.1%	**12,100**

TABLE 2 NOTES:

** Sorted Office Paper Correction **: 2011 SOP tonnage has been adjusted down from 13,078 to 5,078 to correct an error made in a 2011 report.

(1) Mixed Paper: All mixed paper reported was included as MSW even in cases where processors did not reveal sources.
(2) Glass: Glass was handled directly by beverage distributors for CY 2010 and CY 2011.
(3) Plastic Film / Shrink Wrap: This category includes plastic retail bag recycling as most generators were unable to report on plastic bags separate from film and shrink wrap quantities.
(4) Pallets: Only pallets composted or ground for mulch are included in the totals reported for MSW recycling.

TABLE 2 CONTINUED:

(5) Mixed Recyclables: Single stream material collected from municipal curbside recycling programs, including Wilmington, and collected by subscription haulers from both households and businesses. The DSWA column includes DSWA DROP-OFFS AND SINGLE STREAM MATERIAL DELIVERED DIRECTLY TO DSWA FACILITIES.
(6) Tires: As in 2011, a large amount of tires were processed for tire derived fuel in 2012, which is excluded from the EPA recycling rate. The balance went to end uses such as crumb rubber and engineered products including drainage material, and playground surfacing, which is included in the EPA rate.
(7) Lead Acid Batteries: The total reported in 2010 of 14,205 tons was corrected to 1,893 to reflect a data reporting and recording error caught when 2011 reports were filed.
(8) Textiles: Used clothing (including shoes) exported for recycling or reuse. The end uses change based on the condition and changing markets. Typically clothing is sorted into 4 color categories and sold as rags, or bagged as is and sold as clothing. No breakdown of the actual end use is available.
(9) Mixed Plastics may include plastic packaging and other waste plastic generated by manufacturers but sent off site but are reported as mixed plastics by the recycler. Roughly 50% are estimated to qualify as "MSW recycling" consistent with the estimates made in prior years.

As illustrated by Table 2 total recovery, inclusive of DSWA recycling activity, increased by 12,011 tons. That increase was made up predominantly by recyclable materials not delivered to DSWA facilities. This is the result of a combination of factors, as described by material category below, but primarily is the result of increased private sector recycling activity stimulated by the Universal Recycling Law and better reporting due to the mandatory reporting law.

PAPER RECYCLING

CY 2012 data shows a dramatic reduction in the total Paper and Paper Packaging material recycled in the State of Delaware. Overall, paper recycling showed an initial drop of 12,000 tons (rounded). Sorted Office Paper (SOP) showed the single largest reduction, 8,200 tons (rounded). As a result of this dramatic variance, DSM performed follow-up inquiries and discovered one paper recycler made a reporting error on a 2011 survey form. This error was corrected for the 2011 data included in this report and reduced the 2011 SOP category reporting by 8,000 tons. This correction reduced the final paper material reduction to a loss of only 4,700 tons (rounded), and the SOP category, after the correction, was within 80 tons (rounded) of the 2011 reported data.

DSM believes a number of factors have contributed to the variance in the paper material recycling category between CY 2011 and CY 2012 as bulleted below.

- An increase in reliance on single stream recycling collection over separate collection of mixed paper and other materials has impacted the volume of paper reported as recycled. This does not necessarily mean a real decrease in total paper and OCC recycling; some portion of the reduction will be a re-categorization. For example, during previous reporting years some handlers reported seeing an increase in the amount of corrugated cardboard material passing through single stream transfer stations with the material classified as mixed recyclables, not OCC.
- National economic trends may continue to impact OCC's use as a packaging material, and general technology trends have resulted in the migration of office record keeping from paper to digital. These industry trends would suggest a reduction in paper and OCC material

is to be expected and is the result of real industry wide material decline in these categories. This however might be slightly counteracted by an increase in economic activity.

- During both 2011 and 2012 DSM observed some merging activity within paper and OCC handling companies. Different paper handlers categorize paper recyclables in different ways. In addition, this period of handler transition resulted in an over reporting error by one large handler during 2011. During CY 2012 data collection this handler noted that a large portion of the 2011 reported SOP material may have been collected out of state but processed in Delaware, resulting in an accidental inflation of reported material for the 2011 CY period. This error has been adjusted in the 2011 numbers in this report.
- Finally, many large national brands are migrating (waste and) recycling accounts away from local haulers to national waste brokers and haulers, some who are located outside of Delaware. Because these account mangers change, and the brokers change, reliance on the contact used on the survey form from the prior year is insufficient. This constant change in reporting contacts can lead to non-reporting by some generators.

While Delaware saw a reduction in the total amount of Paper and OCC reported as handled during CY 2012, the increase in material reported as Single Stream suggests the real reduction in Paper and OCC is less severe than the 4,700 tons shown by Table 2 above.

OTHER PACKAGING WASTE

Recycling of packaging wastes are up by 26,400 tons primarily due to the increase in single stream recycling activity across Delaware. Single stream recycling was up over 25,000 tons (rounded) for CY 2012. It appears that almost every handler saw an increase in single stream material handling with a small number seeing a dramatic increase in material handling.

Other changes in packaging waste recycling include:

- Recycling of glass reported separately held steady with CY 2011 confirming the large reduction between 2010 and 2011 was due to single stream recycling accepting glass and the sunset of the mandated beverage container redemption program that required wholesalers and distributors of glass beverage containers to handle return containers. It should also be emphasized that glass material is still being captured and recycled. The glass tonnage is now captured as part of the single stream material data. However there is no way to confirm how much glass is collected and recycled through single stream for comparison against prior separate collection programs.
- There was an increase in shrink wrap recycling, which combined with the increase in pallet material reported, is suggestive of a slight upward trend in the economy, specifically retail and industry; both pallets and film are used in the transportation of retail and industry products and material.

SCRAP METAL

White goods (appliances) showed a 4,700 ton increase during 2012 over 2011. This may be indicative of a stabilizing economy with continued demand for new appliances, or better reporting. It should be noted that handlers of White Goods may carry large tonnage inventories from one

calendar year to another. As September is a heavy release period for new appliance models high volume appliance purchasing generally occurs in the Fourth Quarter of the calendar year. This can result in material recycled during the first quarter of the calendar year actually being generated from sales in the fourth quarter of the previous calendar year.

DSM no longer collected reporting of all other scrap metals not counted as MSW recycling to reduce the burden on scrap metal recyclers to report on all commodities.

GREEN WASTE

CY 2012 saw a marked decrease in the recovery of green waste. Leaf and yard waste recovery was up by a little over 5,500 tons over CY 2011, while tree and branch waste was down 23,000 tons (rounded) compared with 2011.

Overall, the difference is likely explained by the following factors:

- Some shifting in the allocation of material from trees and branch material to leaf and yard material is likely. Handlers of these materials tend to estimate the allocations because they do not track the material in the same way as this survey.
- There was a reduction in the number of severe of Storms from three (Hurricane Irene, Tropical Storm Lee and Hurricane Rina) during 2011 to only two (Hurricane Isaac and Hurricane Sandy) during 2012. Also, Hurricane Sandy (the most damaging 2012 storm) occurred at the end of October and clean up and counting of some of the debris related to this storm may not have occurred until the beginning of 2013. Hurricane Irene occurred in August and the clean-up was likely completed within the calendar year 2011. Sandy appears to have had more of a coastal impact whereas Irene's impact was more aggressively inland.
- In addition, the demand of the Wilmington Organic Recycling Center (WORC) and the Blue Hen Organics facilities may help to drive increased green waste recycling, or better reporting of diverted green waste.
- A number of large material handlers do not operate with scales. Instead, these handlers measure volume and material handling in cubic yards. The total annual yardage material figure is then split between yard waste and tree waste with the split often approximated as a 60 percent yard waste and 40 percent tree waste with the densities assigned by DSM if the handler does not report in tons. This process relies heavily on estimates by the material handler for the split and by DSM for the density calculation for the material category.
- For the 2012 reporting period, based on feedback from material handlers, DSM revised down the weight per cubic yard allocation for Tree and Branch material compared with the 2011 year. One large contributor had reported an average yardage weight for their heavier material of 800 pounds per cubic yard. This same reporter noted that the average yardage weight for their heavier material was only 600 pounds per cubic yard for the 2012 period. These differences in the density have a direct impact on the final reporting tonnage for the green waste material handled and reported in Delaware.

FOOD WASTE

There was an overall increase of 5,000 tons (rounded) in food waste composting reported for 2012. Fats, oil and grease also saw an increase of 1,000 tons (rounded) compared with 2011. An increase in food waste composting for CY 2012 is likely the result of having several facilities offering composting instate as an alternative to landfilling of these organics, combined with more haulers offering food waste collection services and more businesses (mainly supermarkets and some large restaurants) participating in food waste separation programs. This trend is expected to continue.

VEHICLE WASTE

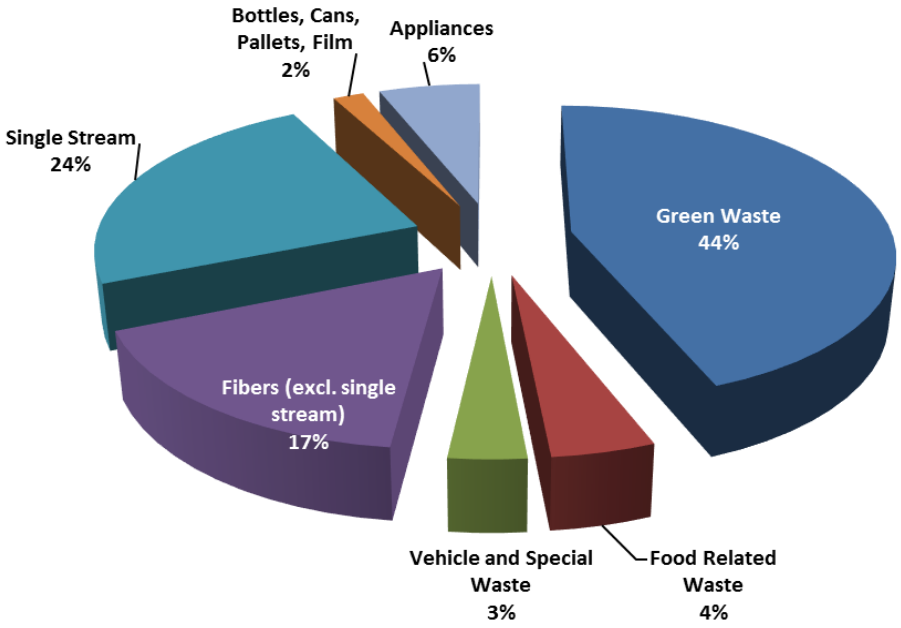
The tons of tires reported as recovered for other uses decreased by 4,000 tons (rounded). This decrease was largely attributable to several critical reporters that either did not provide data, were no longer an active tire recycler, or provided data that showed a reduction in materials handled.

There has been an industry trend diverting used tires from traditional recycling to fuel – either going to waste to energy facilities in the region, or being processed for tire derived fuel and sold to facilities farther away. This may be because tires were no longer demanded for construction at the Cherry Island Landfill – which would count as recycling - whereas tires going to waste-to-energy do not. This may also be the result of one tire recycler no longer being active in the region that processed tires for engineering applications.

SUMMARY

Figure 2, below illustrates the breakdown of MSW materials recovery, by material type, for Delaware for 2011, including DSWA recycling activity. Figure 2 emphasizes the growing role of single stream recycling and leaf and yard waste composting in materials recycling in Delaware.

FIGURE 2: MATERIALS RECOVERY BY GENERAL MATERIAL CATEGORY INCLUDED IN EPA DEFINITION OF MSW RECYCLING (STATE OF DELAWARE, CY 2011)



RESIDENTIAL VS. COMMERCIAL RECYCLING ACTIVITY

DSM estimated the percentage of each material recycled and classified as MSW generated by a residential as opposed to a commercial source. These allocations are shown in Table 3.

While in some cases the source of the material was clear, in others DSM was required to make our best professional judgment as to the source of the material. Since EPA does not attempt to quantify residential and commercial recycling separately, generally acceptable guidelines for allocation of materials recycling to the residential and commercial sector are not available.

In other cases, DSM worked with RPAC to agree upon acceptable allocations of materials recycling to the commercial and residential sectors. For example, 90 percent of all of white goods are reported as residential recycling. Leaf and yard waste totals are allocated as 8 percent commercial with the balance residential consistent with the 2004 survey of yard waste generators and processors.[3] Finally trees and branches are allocated as 11 percent commercial, and the balance residential, consistent with the same 2004 survey. This percentage may need to be revisited with the growth in yard and tree waste processing in light of the landfill bans.

It should be noted when reading Table 3 that in the past significant amounts of newspaper, corrugated cardboard and mixed paper generated by residential sources were reported separately by DSWA, while now all paper, with the exception of a declining stream of separated cardboard, collected by DSWA is a single stream of paper and containers and reported under "packaging". This makes year to year comparisons of paper recycling in this report and in aggregate more difficult.

[3] This 2004 report surveyed landscapers and other generators or processors of yard waste, brush and tree waste and found roughly 8 percent of leaf and yard waste and 11 percent of tree waste was stated to be from commercial sources.

***TABLE 3:** ESTIMATE OF RESIDENTIAL VS. COMMERCIAL MSW RECYCLING ACTIVITY (CY 2012)*

Material Category	*Residential* (tons)	*Commercial* (tons)	Total MSW (tons)
Paper			
Corrugated (OCC)	245	53,295	53,540
Newspaper (ONP)	0	909	909
Sorted Office Paper	9	4,992	5,001
Mixed Paper	23	8,151	8,174
Subtotal:	**276**	**67,348**	**67,624**
Packaging			
Glass	215	117	332
Plastic Film / Shrink Wrap (1)	0	1,452	1,452
Plastic Containers	0	30	30
Aluminum Cans (2)	516	180	696
Pallets	0	4,717	4,717
Mixed Recyclables (3)	66,317	28,973	95,290
Subtotal:	**67,048**	**35,469**	**102,517**
Vehicle Waste (4)			
Tires	3,059	765	3,823
Lead Acid Batteries	1,641	410	2,052
Oil Filters	303	76	379
Subtotal:	**5,003**	**1,251**	**6,254**
Special Wastes			
Carpet	0	0	0
Textiles (5)	4,284	0	4,284
Florescent Bulbs	0	15	15
Other Batteries	43	4.7	47.3
Electronics (6)	1,353	1,419	2,772
Subtotal:	**5,679**	**1,438**	**7,118**
Food Related Wastes			
Fats, Oil, Grease	0	5,103	5,103
Food Waste	0	12,701	12,701
Subtotal:	**0**	**17,804**	**17,804**
Green Waste			
Leaf and Yard Waste (7)	116,599	9,863	126,463
Trees and Branches (8)	39,902	4,987	44,888
Clean Wood	0	5,410	5,410
Subtotal:	**156,501**	**20,260**	**176,761**
Metals			
White Goods (9)	21,521	2,391	23,912
Subtotal:	**21,521**	**2,391**	**23,912**
Other			
Mixed Plastics (10)	0	3,965	3,965
Subtotal:	**0**	**3,965**	**3,965**
Total:	**256,028**	**149,925**	**405,953**

TABLE 3 NOTES (NUMBERS MAY NOT ADD DUE TO ROUNDING):

(1) Includes retail bags returned as part of grocery and retail recycling programs.
(2) Aluminum can recycling reported by scrap metal dealers assumed to be 50% residential and 50% commercial.
(3) Single stream recycling through Wilmington and other municipalities assumed to be 100% residential, and deliveries to DSWA drop-offs and transfer stations, 80 percent residential. All other single stream recycling reported was estimated as residential and commercial by the reporting entity.
(4) All vehicle wastes recycled are assumed to be 80% residential and 20% commercial. This is consistent with past reporting. Reported source of tires was 80% cars by one major tire recycler.
(5) All textiles are considered residential consistent with past reporting. The documented source of textiles is unknown, however DSM assumes most textiles came from residential sources. Also textiles reused are excluded under EPA but included here since reuse versus recycling cannot be determined.
(6) Electronics collected by DSWA are assumed to be 70% residential, and all other electronics assumed to be 100% commercial consistent with past reporting.
(7) Leaf and Yard waste allocations were made using the same percentage used in previous DSM reports.
(8) Trees and branches waste allocations were made using the same percentage used in previous DSM reports.
(9) White goods collected by DSWA assumed to be 90% residential and 10% commercial. All other white goods collected by scrap metal recyclers and retailers assumed to be 100% residential consistent with prior reporting.
(10) Mixed plastics are assumed to be 100% commercial consistent with past reports.

CALCULATING THE RECYCLING RATE FOR DELAWARE

CALCULATING THE DENOMINATOR

To determine total disposal in Delaware for CY 2012, DSM reviewed scale data kept by DSWA on deliveries to the three landfills and three transfer stations during CY 2012. DSM compared these figures to past totals to try to identify any patterns in the change in deliveries which have trended downward since 2006.

Based on this review, DSM believes that approximately 33,333 tons of MSW (or 2/3 of the assumption made for MSW diverted for CY 2011) was likely generated in Delaware but not disposed at DSWA facilities in CY 2012 and could not be explained by other factors such as: the economy; a decline in construction activity; increased recycling; and, diversion of C&D to other processing and disposal facilities. As a consequence DSM has adjusted the denominator up by 33,333 tons to reflect waste generated in Delaware but not disposed at DSWA facilities.

The steps taken to estimate total municipal solid waste disposal in Delaware and to allocate MSW disposed to the residential and commercial sector were as follows:

First, DSM obtained CY 2012 data on deliveries of solid waste to each of DSWA's transfer stations and landfills. This included data on whether the waste was classified as municipal solid waste or construction and demolition wastes (C&D) at each DSWA facility.

Second, DSM obtained data on the quantity of solid waste delivered by vehicle type to each DSWA facility (e.g. front end loader, rear end loader, side loader, roll-off, pick-up truck). Using 2011 survey data on the typical source of waste by vehicle type coming into each facility, DSM allocated total waste tonnage for the year 2012 for each vehicle type to residential, commercial, C&D or self-haul categories.

Third, DSM totaled residential, commercial, C&D and self-haul quantities for each facility calculated by the vehicle type allocations made, and from this calculated total tons of residential, commercial, C&D and self-haul waste delivered statewide for 2012.

Finally, the self-haul total (estimated at 7.6 percent of total deliveries using the vehicle allocation method described above) was allocated equally to residential, commercial and C&D sources consistent with past facility surveys. Table 4-1 and 4-2 show these steps.

TABLE 4-1: *SELF-HAUL, RESIDENTIAL, COMMERCIAL, AND C&D WASTE DELIVERIES TO DSWA FACILITIES BASED ON VEHICLE TYPE (CY 2012)*

	Waste, By Generator Type, 2012				
DSWA Facility	Self Haul (tons)	Res (tons)	Com (tons)	C&D (tons)	Total
NSWMC	15,562	110,685	146,747	19,984	292,978
CSWMC	6,306	35,332	24,843	3,132	69,613
SSWMC	16,112	24,219	28,795	48,408	117,534
PTCTS	3,813	46,355	31,916	1,881	83,965
MTS	2,229	16,093	11,735	605	30,662
RT5TS	6,614	47,157	16,572	432	70,775
Total:	50,637	279,840	260,608	74,442	665,527

TABLE 4-2: *REALLOCATION OF SELF-HAUL WASTE TO RESIDENTIAL, COMMERCIAL, AND C&D SECTOR TO ESTIMATE TOTAL RESIDENTIAL AND COMMERCIAL WASTE DELIVERIES TO DSWA FACILITIES (CY 2012 & CY 2011 COMPARISON)*

Sector	Total, From Above (tons)	Reallocation of Self-haul Deliveries	Total	From 2011 Report	Reallocation of Self-haul Deliveries	Total
	2012 (tons)	2012 (tons)	2012 (tons)	2011 (tons)	2011 (tons)	2011 (tons)
Residential	279,840	16,879	296,719	286,713	17,350	304,063
Commercial	260,608	16,879	277,487	301,350	17,350	318,700
C&D	74,442	16,879		66,154	17,350	
Self Haul	50,637	0		52,050		
Totals:	**665,527**	**50,637**	**574,206**	**706,267**	**52,050**	**622,763**

TABLE 4-3: *COMPARISON OF CY2011 AND CY2012 TOTAL WASTE DELIVERIES TO DSWA FACILITIES*

Facility	CY 2011 (tons)	CY 2012 (tons)	Difference (11-12) (tons)	(%)
NSWMC	335,479	**292,978**	(42,501)	-13%
CSWMC	82,316	**69,613**	(12,703)	-15%
SSWMC	122,472	**117,534**	(4,937)	-4%
PTCTS	66,146	**83,965**	17,819	27%
MTS	27,780	**30,662**	2,882	10%
RT5TS	72,073	**70,775**	(1,299)	-2%
Total:	**706,265**	**665,527**	(40,739)	-6%

CALCULATING THE RECYCLING RATE

As discussed above, an estimated 33,333 tons was added back into total MSW disposal and allocated equally to the residential and commercial sectors to recognize unexplained diversion of waste, and accurately report the annual MSW recycling rate for the State.

Using totals from Table 3 for residential and commercial recycling activity in the numerator and the results of Tables 4-1 and 4-2 in the denominator, and then adding back in 33,333 tons allocated equally to the residential and commercial sectors, the residential and commercial recycling rates are calculated along with the State's MSW recycling rate as a whole as shown in Table 5.

TABLE 5: *CALCULATION OF RESIDENTIAL AND COMMERCIAL RECYCLING RATE, AND THE TOTAL MSW RECYCLING RATE (CY 2012)*

Sector	(A) Recycling *(tons)*	(B) Disposal *(tons)*	(C) Other Disposal *(tons)*	A / (A + B + C) Recycling Rate *(%)*
Residential	256,028.1	296,719.2	16,666.7	45.0%
Commercial	149,925.1	277,487.0	16,666.7	33.8%
Total MSW:	**405,953.3**	**574,206.2**	**33,333.3**	**40.1%**

APPENDIX A

SCOPE OF MATERIALS AND ACTIVITIES INCLUDED IN THE STANDARD MSW RECYCLING RATE SOURCE: EPA, 1996

TABLE A. SCOPE OF MATERIALS INCLUDED IN THE STANDARD MSW RECYCLING RATE

MATERIAL[1]	WHAT IS MSW	WHAT IS NOT MSW[2]
Food Scraps	Uneaten food and food preparation wastes from residences and commercial establishments (restaurants, supermarkets, and produce stands), institutional sources (school cafeterias), and industrial sources (employee lunchrooms).	Food processing waste from agricultural and industrial operations.
Glass Containers	Containers; packaging; and glass found in appliances, furniture, and consumer electronics.	Glass from transportation equipment (automobiles) and construction and demolition (C&D) debris (windows).
Lead-Acid Batteries	Batteries from automobiles, trucks, and motorcycles.	Batteries from aircraft, military vehicles, boats, and heavy-duty trucks and tractors.
Tin/Steel Cans and Other Ferrous Metals	Tin-coated steel cans; strapping; and ferrous metals from appliances (refrigerators), consumer electronics, and furniture.	Ferrous metals from C&D debris and transportation equipment.
Aluminum Cans and Other Nonferrous Metals	Aluminum cans; nonferrous metals from appliances, furniture, and consumer electronics; and other aluminum items (foil and lids from bimetal cans).	Nonferrous metals from industrial applications and C&D debris (aluminum siding, wiring, and piping).
Paper	Old corrugated containers; old magazines; old newspapers; office papers; telephone directories; and other paper products including books, third-class mail, commercial printing, paper towels, and paper plates and cups.	Paper manufacturing waste (mill broke) and converting scrap not recovered for recycling.
Plastic	Containers; packaging; bags and wraps; and plastics found in appliances, furniture, and sporting and recreational equipment.	Plastics from transportation equipment.
Textiles	Fiber from apparel, furniture, linens (sheets and towels), carpets[3] and rugs, and footwear.	Textile waste generated during manufacturing processes (mill scrap) and C&D projects.
Tires	Tires from automobiles and trucks.	Tires from motorcycles[4], buses, and heavy farm and construction equipment.
Wood	Pallets; crates; barrels; and wood found in furniture and consumer electronics.	Wood from C&D debris (lumber and tree stumps[5]) and industrial process waste (shavings and sawdust).
Yard Trimmings	Grass, leaves, brush and branches, and tree stumps.[5]	Yard trimmings from C&D debris.
Other	Household hazardous waste (HHW)[6], oil filters, fluorescent tubes[7], mattresses, and consumer electronics.	Abatement debris, agricultural waste, combustion ash, C&D debris, industrial process waste, medical waste, mining waste, municipal sewage and industrial sludges, natural disaster debris[8], used motor oil, oil and gas waste, and preconsumer waste.

TABLE A. NOTES

[1] Composite materials are categorized according to their main constituent; however, they can be designated as a separate category under Other MSW if they cannot be otherwise categorized.

[2] These wastes are not considered MSW due to one or more of the following reasons: (1) they are not defined as MSW in EPA's *Characterization of Municipal Solid Waste in the United States*, (2) they have not been historically handled and disposed of as MSW, (3) they are regulated as hazardous waste, and/or (4) they were generated by a preconsumer source. These non-MSW wastes are referred to as Other Solid Waste in this guide and on the survey forms and worksheets.

[3] Carpets are categorized as Textiles when discarded in MSW and are included in the rate calculation. When carpets are discarded in C&D debris, they are not considered MSW and are excluded from the rate calculation.

[4] Tires from motorcycles are not defined as MSW because they historically have not been characterized as MSW in EPA's *Characterization of Municipal Solid Waste in the United States*.

[5] Tree stumps are categorized as Yard Trimmings when discarded in MSW and are included in the rate calculation. When tree stumps are discarded in C&D debris, they are not considered MSW and are excluded from the rate calculation.

[6] HHW includes paints, stains, varnishes, solvents, pesticides, and other materials or products containing volatile chemicals that catch fire, react, explode under certain circumstances, or that are corrosive or toxic. Specific examples include oil-based paint, antifreeze, household cleansers, and bug sprays. Used motor oil is excluded.

[7] Fluorescent tubes are categorized as Other MSW when found in MSW and are included in the rate calculation. When fluorescent tubes are discarded in C&D debris, they are not considered MSW and are excluded from the rate calculation.

[8] Natural disasters include earthquakes, floods, hurricanes, and tornados. Heavy storms are not considered natural disasters.

TABLE B. SCOPE OF ACTIVITIES INCLUDED IN THE STANDARD MSW RECYCLING RATE

RECYCLABLE MATERIAL	WHAT COUNTS AS RECYCLING	WHAT DOES NOT COUNT AS RECYCLING[1]
Food Scraps	Composting of food scraps from grocery stores, restaurants, cafeterias, lunchrooms, and private residences, and the use of food scraps to feed farm animals.	Backyard (onsite) composting of food scraps, and the use of food items for human consumption (food banks).
Glass	Recycling of container and packaging glass (beverage and food containers), and recycling of glass found in furniture, appliances, and consumer electronics into new glass products such as containers, packaging, construction materials (aggregate), or fiberglass (insulation).	Recycling of glass found in transportation equipment and construction and demolition (C&D) debris, recycling of preconsumer glass or glass from industrial processes, and reuse of refillable glass bottles.
Lead-Acid Batteries	Recycling of lead-acid batteries found in cars, trucks, or motorcycles into new plastic and lead products.	Recycling of lead-acid batteries used in large equipment, aircraft, military vehicles, boats, heavy-duty trucks and tractors, and industrial applications.
Metals	Recycling of aluminum and tin/steel cans, and recycling of metals found in appliances and packaging into new metal products.	Reuse of metal containers, packaging, furniture, or consumer electronics, and recycling of metals found in transportation equipment (autobodies) and C&D debris.
Paper	Recycling of paper products (old newspapers and office papers) into new paper products (tissue, paperboard, hydromulch, animal bedding, or insulation materials).	Reuse of paper products, recycling of preconsumer or manufacturing waste (trimmings, mill broke, print overruns, and overissue publications), and combustion of paper for energy recovery.
Plastic	Recycling of plastic products (containers, bags, and wraps), and recycling of plastic from furniture and consumer electronics into new plastic products (fiber fill and plastic lumber).	Reuse of plastic products (storage containers and sporting equipment), recycling of preconsumer plastic waste or industrial process waste, and combustion of plastics for energy recovery.
Textiles	Recycling of textiles into wiper rags, and recycling of apparel and carpet fiber[2] into new products such as linen paper or carpet padding.	Reuse of apparel.
Tires	Recycling of automobile and truck tires into new products containing rubber (trash cans, storage containers, and rubberized asphalt), and use of whole tires for playground and reef construction.	Recycling of tires from motorcycles, buses, and heavy farm and construction equipment, retreading of tires, and combustion of tire chips for energy recovery.
Wood	Recycling of wood products (pallets and crates) into mulch, compost, or similar uses.	Repair and reuse of pallets, combustion of wood for energy recovery, recycling of industrial process waste (wood shavings or sawdust), and recycling of wood from C&D debris.
Yard Trimmings	Offsite recycling of grass, leaves, brush or branches[3], and tree stumps[4] into compost, mulch, or similar uses; and landspreading of leaves[5].	Mulching of tree stumps[4] from C&D debris, backyard (onsite) composting, grasscycling, landspreading of leaves[5], and combustion of yard trimmings for energy recovery.
Other	Household hazardous waste (HHW)[6], oil filters, fluorescent tubes[7], mattresses, circuit boards, and consumer electronics[8].	Recycling of used oil, C&D debris (asphalt, concrete, and natural disaster debris), transportation equipment (autobodies), municipal sewage sludge, and agricultural, industrial, mining, and food processing waste.

TABLE B. NOTES

[1] These activities are not considered recycling due to one or more of the following reasons: (1) they are not defined as recycling in EPA's *Characterization of Municipal Solid Waste in the United States*, (2) they involve the recycling of materials that are not part of MSW, (3) they involve reuse or source reduction, and/or (4) they involve the recycling of preconsumer waste.

[2] Carpeting is categorized as Textiles when discarded in MSW and is included in the rate calculation. When carpets are discarded in C&D debris, they are excluded from the rate calculation.

[3] Includes woody material such as branches, brush, and whole trees such as Christmas trees.

[4] Tree stumps are categorized as Yard Trimmings when discarded in MSW and are included in the rate calculation. When tree stumps are discarded in C&D debris, they are excluded from the rate calculation.

[5] Landspreading of leaves counts as recycling if the manner of the application allows timely biodegradation of the organic plant material. Landspreading of leaves does not count as recycling if the manner of the application precludes the timely biodegradation of the organic plant material.

[6] HHW includes paints, stains, varnishes, solvents, pesticides, antifreeze products, and other materials or products containing volatile chemicals that catch fire, react, explode under certain circumstances, or that are corrosive or toxic. Specific examples include oil-based paint, antifreeze, household cleansers, and bug sprays. Used motor oil is excluded.

[7] Fluorescent tubes are categorized as Other MSW when discarded in MSW and are included in the rate calculation. When fluorescent tubes are discarded in C&D debris, they are excluded from the rate calculation.

[8] Composite materials are categorized according to their main constituent; however, they can be designated as a separate category under Other if they cannot be otherwise categorized.

APPENDIX B

LETTER FROM DNREC AND DELAWARE ANNUAL RECYCLING ACTIVITY REPORT FORM (CY 2012)

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
& ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

SOLID & HAZARDOUS WASTE
MANAGEMENT BRANCH

TELEPHONE: (302) 739-9403
FAX NO.: (302) 739-5060

February 11, 2013

Subject: Calendar Year 2012 Annual Recycling Report due February 15, 2013

Dear Recyclables Generator:

This letter serves as a reminder that your company's calendar year **2012** recyclables generation data is due February 15, 2013. Title 7 §6056(a) of the Delaware Code made reporting the type and quantity of recyclables generated mandatory. The first effective reporting deadline was February 15, 2012 starting with the recycling activity that took place in calendar year 2011. This is the second year of this mandatory reporting requirement and each calendar year reports are due by February 15th for the prior year.

If you are amongst the majority of respondents that reported recyclables generation data for 2011, thank you for your response As Delaware's Recycling Public Advisory Council's (RPAC) responsibilities include advising the legislature on recycling policy for Delaware, accurate information is critical to making practical recommendations. For this reason your participation in these reporting requirements is vital to maintaining sound recycling policy in Delaware. The requested information is also critical to accurately calculate the state's recyclables diversion rate and track progress toward meeting the State's established diversion goals. This cannot be achieved if those persons responsible for managing recyclables fail to report.

If you did not respond, **please be aware that reporting is mandatory** and that 7 *Del. C.* § 6059 affords the Department enforcement authority, inclusive of the ability to impose monetary fines of $100 to $500 for each day of violation. While this enforcement option was not exercised during the first year transition period of mandatory reporting, the Department intends to pursue one hundred percent compliance with the calendar year 2012 reporting requirement.

DSM Environmental Services, Inc. (DSM) worked with RPAC to design the survey and has used the survey to collect and aggregate data on an annual basis, under both voluntary and mandatory reporting requirements, for several years now. DSM offers survey participants the option of keeping their report confidential, and has always aggregated the survey data in its annual report to RPAC to assure that individual company data are not reported. A copy of last year's report can be found in Appendix C at: http://www.dnrec.delaware.gov/whs/awm/Recycling/Documents/The%20Eleventh%20Annual%20Report%20FINAL%20DRAFT.pdf

DSM also analyzes the data to ensure double counting does not occur and determines the total quantity of materials recycled in Delaware. This aggregated data is then supplied to RPAC for the purpose of verifying Delaware's recyclables diversion rate. This process has worked well and for this reason DSM will also manage calendar year 2012 survey data.

Delaware's good nature depends on you!

The Universal Recycling Reporting Guidance is available for your review at: http://www.dnrec.delaware.gov/whs/awm/Recycling/Documents/2011%20recycling%20reporting%20guidance%20draft%204.28.11.pdf.

Attached to this letter you will find DSM's letter requesting the recycling data and the 2012 reporting form. If you have any questions regarding "completion of the reporting form" please call Natalie Starr or Mike Cammock of DSM at 802-674-2840. If you have questions about the mandatory reporting requirement please contact James Short at 302-739-9403. I thank you in advance for your cooperation and commend you for your ongoing recycling efforts.

Sincerely,

Nancy C. Marker

Nancy C. Marker
Environmental Program Administrator
Solid and Hazardous Waste Management Section

NCM:JDS:krc
MandatoryRepLtr021113

Attachments

cc: BJ Vinton, Chair RPAC
Mike Parkowski, DSWA

Delaware Annual Recycling Activity Report Form

REPORT FORM FOR CALENDAR YEAR 2012

If you have any questions about this form, please call the third party consulting firm, DSM Environmental, at (802) 674-2840. If you have questions about the reporting requirement, please contact the DNREC's Solid and Hazardous Waste Management Section at (302) 739-9403.

Company Information

Company _____ Subsidiary of _____

Mailing Address _____ Contact Name _____

City _____ State Zip _____ Title _____

Physical Address _____ Phone _____

☐ Same as mailing _____ FAX _____

City _____ State Zip _____ Email _____

Company Type: Recyclables Collector/Hauler; Processor; End User; Municipality; Self Marketing Generator; Other _____

If you use a waste hauler or recycling service(s) to collect your recyclables please indicate the company (or companies) name, address and contact information and no further information is required: _____

Materials Recycled *(between January 1 and December 31, 2012)*

Material [1]	Annual Tons Recycled 2012	Please list (as available) the company or location where you send the material for Recycling, Processing or End Use [2]	*Percent Commercial*	*Percent Residential*	*Approx.* percent of material originating from Delaware ONLY [3]
			%	%	%
			%	%	%
			%	%	%
			%	%	%
			%	%	%
			%	%	%
			%	%	%
			%	%	%
			%	%	%
			%	%	%

1. Please be specific as to material type: Corrugated; Newspaper; Office Paper; Mixed Paper; Glass; Shrink Wrap; Retail Bags; Plastic Containers; Aluminum Cans; Pallets; Mixed Recyclables or Single Stream; White Goods/Appliances; Leaf and Yard Waste; Trees and Branches; Clean Wood; Tires recycled but not burned; Lead Acid Batteries; Other Batteries; Oil Filters; Textiles; Electronics; Florescent Bulbs; Carpet; Fats-Oil-Grease; Food Waste; Mixed Plastics (Non-Industrial).
2. This information is important so that DSM does not double count material that is handled by another recycler that participates in our survey. If you broker direct to an end user outside of DE, and you would prefer not to list them, just list "End-User outside of DE."
3. For companies that receive recycling material from outside the state of Delaware, estimate the percent of material from Delaware only.

Non-Disclosure

The information provided is confidential

Yes No

DSM Environmental Services, Inc. (DSM) will hold confidential any information and data provided to us which you specify as confidential, as part of the Delaware Statewide Municipal Recycling Annual Report that DSM is conducting for the Delaware Recycling Public Advisory Council (RPAC). The purpose of the study is to develop reasonable and professional estimates of the quantity of material recovered for recycling from residential and non-residential activities located in Delaware, and to ensure no double counting of material occurs. Data provided to DSM will be aggregated with all other material quantities reported to develop a single, annual quantity (in tons) of material recycled for each material type. DSM agrees not to release, divulge or report any individual data or information reported to any party, including RPAC, and will maintain complete confidentiality with the data using it only for aggregate material reporting.

E-mail completed form to: DSM@DSMEnvironmental.com
Or Fax completed form to DSM at: (802) 674-6915

DSM Environmental Services, Inc.
P.O. Box 2 • Windsor, VT 05089
802.674.2840 • 802.674.6915 fax
www.dsmenvironmental.com